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ABSTRACT

This paper presents a critique of current research on functional understanding of thinking and teaching. Three trends in cognitive research are examined. The "reification of mind" (the assumption that "mind" is an entity just as is body) is examined as a research trend that accepts knowledge as existing independent of the biographies, the intentions, and the activities of persons. Criticism is also leveled at the other trends which deny the emotional elements of learning and fail to consider the contexts of educating. It is pointed out that if strategies to facilitate comprehension and cognition are to be found, the meanings assigned to those strategies are likely to be interpreted through a framework developed in formal schools. If learning is to be improved, an examination is in order of the taken-for-granted structure of schools and how the structure must be modified. (JD)

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TEACHER AND STUDENT COGNITION:
Why Should we Care?

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TEACHER AND STUDENT COGNITION: WHY SHOULD WE CARE?

> I can remember being moved to the quick by Dewey's notion (set forth in Art and Experience) that mind should be conceived as a verb and not a noun, that it had to do with attentiveness, with care and solicitude, with engagement with lived situations (Greene, 1987, p. 5).

> The purpose of social research is (or ought to be) to improve human practices. (Howe, 1985, p. 15)

It seems that most of us interested in cognitive work have as a goal, however implicit or distal, the improvement of the processes of educating. We care about teacher and student thoughts and thinking because we hope that better understanding of them will lead us to better facilitation of learning. Research on teacher and student cognition has increased and methods of investigation have proliferated. The argument I will make here is that some of the directions taken in recent cognitive work may leave us no further along in our quest for a functional understanding of thinking that could guide efforts to improve our practices.

Much of our concern with teacher and student cognition can be seen as a reaction to weaknesses and biases in educational research and development. For example, curriculum development efforts in the 1960's attempted to produce "teacher-proof" materials and by doing so trivialized and denigrated the role and professional knowledge of teachers. Many current reform efforts, as Duckworth (1984) noted, continue to ignore the knowledge of teachers. Much of the process-product and effective schools research has also ignored the knowledge and thinking of teachers and students. These research strands tend to focus on narrowly defined outcome measure of student achievement to judge the success of easily observed and recorded schooling practices.

As we avoid these dangers and attend to cognition, we must take care to not create new dangers. This paper will examine three trends that, if continued, could lead cognitive research to dead ends or bad ends. These trends are: a reification of mind and knowledge, a denial of the emotional elements of learning, and a failure to consider the contexts of educating.

REIFICATION OF MIND

Howard Gardner wrote in The Mind's New Science.

> To my mind, the major accomplishment of cognitive science has been the clear demonstration of the validity of positing a level of mental representation; a set of constructs that can be invoked for the explanation of cognitive phenomena, ranging from visual perception to story comprehension. Where 40 years ago, at the height of the behaviorist era, few scientists dared to speak of schemas, images, rules, transformations, and other mental structures and operations, these representational assumptions and concepts are now taken for granted and permeate the cognitive sciences. (Gardner, 1985, p. 383).

The cognitive science efforts lauded by Gardner seem to continue the Cartesian category mistake Ryle pointed out in 1949, the assumption that "mind" is an entity just as is body, and so must be governed by rules analogous to the rules that were then being discovered governing the motions of physical bodies.

> Since, according to the doctrine, minds belong to the same category as bodies and since bodies are rigidly governed by mechanical laws, it seemed to many theorists to follow that minds must be similarly governed by rigid non-mechanical laws. The physical world is a deterministic system, so the mental world must be a deterministic system. (p. 21).

Psychology became the science that sought to determine the laws governing the action of mind. Ryle argues elegantly that it is absurd to conjoin or disjoin the terms mind and body because they represent different categories. Thus, there is no need to search for the universe of mind and the laws governing it. Ryle writes:

> Abandonment of the two-worlds legend involves the abandonment of the idea that there is a locked door and a still to be discovered key. (p. 302)

Gardner's quote makes explicit an attempt to make keys to unlock the door. By attempting to describe people's knowing and knowledge, it is too easy to focus our activities on efforts to clarify terms, sharpen distinctions, develop taxonomies, and standardize methods and procedures. We begin to simplify, to construct artificial situations or clear cases to facilitate analysis. There <u>is</u> a lack of consistency of use or clear definitions of terms used in cognitive psychology. However, too much focus on the methods to elicit and represent cognitive structures may generate the kind of mentalist mumbojumbo (see Greer, 1983) that gave rise to behaviorism.

There is nothing wrong with clarity or consistency. But to try to reach these ends by developing general procedures and universal methods can lead too easily to a reification of knowledge, an acceptance of knowledge as existing independent of he biographies, the intentions, and the activities of persons. For example, in some of the articles on student misconceptions, there is an implicit "right answer/wrong answer" bias. Instead of representing student knowledge structures as part of an effort to learn how students are making sense of a subject matter, the focus of these articles switches to a product, the representation of knowledge. And subtly, this representation is compared to some "correct" representation. We begin to judge this represented knowledge. We may be more sophisticated and consider degrees of rightness or wrongness, but in the process knowledge has been reified and externalized, separated from human action.

We must not forget that when we develop representations of mental arrangements or processes, we are only developing models for what we think goes on. We are constructing metaphors - this person talks <u>as if</u> they viewed heat in this fashion, this person reacts <u>as though</u> they

were using this kind of process. If we forget the subjunctive, we may forget to be interested in the processes of constructing and refining knowledge.

This kind of forgetfulness is too common in educational research and curriculum development. An example can be found in many of the packages being sold that are designed to foster "critical thinking" or "higher order thinking skills." As Hultgren observed:

> The more tightly we control our language and discourse about thinking in this way, the more severely we cover or suffocate what it is that we are seeking to illuminate. If we hand down these skills from teachers to students, and then measure whether or not students have indeed learned these skills, what do we really come to understand about what thinking is like? (Hultgren, 1987, p. 3)

Driven by a search for psychological laws, we inevitably move away from consideration of the complexities and difficulties that lead to our original efforts to look beyond mere behaviors and try to understand "the learner-in-the-process-of-learning (West and Pines, 1985, p. 1)." Scientistic pressures, which all of us have internalized at least to some degree, may pull us to develop general procedures and practices so that quick and easy comparisons across studies are possible.

An Alternative Focus

Ryle (1949) actually supplies an alternative way to explore cognition that avoids accepting an internal/external split and an effort to discover mentalist laws. He suggests we focus on:

> those human actions and reactions, those spoken and unspoken utterances, those tones of voice, facial expressions, and gestures, which have always been the data of all the other students of men, have, after all, been the right and the only manifestations to study. They and they alone have merited, but fortunately not received, the grandiose title 'mental phenomena.' (p. 302)

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Since Ryle, many educational researchers have systematically studied thinking in classrooms in a way that does not result in a reification of knowing. The discussion by David Cohen (1987) provides one example. He used a form of concept mapping but in a way that did not focus on the completed product. His description of concept mapping exercises lets us experience vicariously how his students used their

concept maps to discuss their thinking and understandings.

The careful analysis of classroom communications can also provide a way for us to study learners in the process of learning. Lemke (undated) has used methods of "social semiotics" to study physics classrooms. A social semiotics assumes:

> all meaning is made by specific human social practices. When we say that the mastery of physics of literary criticism is being able to talk physics like a physicist or write analyses like a critic, we are talking about <u>making the meanings</u> of physics or literary criticism using the resources of spoken and written language. Talking physics and writing criticism are <u>social practices</u>. (Lemke, p.1)

In this paper Lemke uses the notions of genre and semantic patterns to analyze a brief section of teacher/student discussion in a physics class. His analysis is a powerful one for it allows us to see not just the existence of but the <u>perpetuation</u> of a student misconception. He teases out how the student fails to grasp the distinctions made by the teacher and how the teacher, using the formal language of physics, fails to detect his failure to make distinctions explicit in a way the student could grasp.

Lemke's analyses are painstaking and time consuming. No one in the act of teaching could make such analysis. However, the analyses can inform our reflection on our thinking and alert us to the kinds of miscommunications that occur when a novice and expert talk about subject matter. These kinds of analyses give us another way to look at student thinking in a discipline.

<u>CARE AND SOLICITUDE: THE EMOTIONS</u>

Much of the work in cognition assiduously avoids any consideration of emotion, or as educational jargon would have it, the affective domain. To make such a separation not only eviscerates the conception of a human but also leads to inaccurate results of experimentation in cognition. Leslie Hart (1976) explicated nicely a mechanism that accounts for the complex relationship between emotion and cognition. His model makes sense of the findings that demonstrate how emotions do influence strongly cognition.

In school classrooms in which the teacher's practices instantiate the control functions of schooling and the implicit hierarchial organization of people and knowledge, knowledge becomes power, wielded by those who have it over those who do not. However subtly control operates, the emotional climate generated is one of domination and fear, rather than care and solicitude. The thinking of individuals will be constricted, as will the social interactions necessary for rational discussion. In such settings, students can play it safe, follow the rules, and passively memorize what they need to pass the tests. Or, students can resist and refuse to memorize. In either case, there is no authentic learning, no new meanings are generated and students remain uninvolved.

Those of us who want to change what goes on in schools need to surface the assumptions that lead to this emotional state. We need to

> instructional, conversational routines known to characterize "teaching and learning" talk (Edwards, 1980, 1981; McHoul 1978; Mehan, 1979) more than they reflect the complexity, informality, and local management of everyday, conversational, multiparty talk (Freebody and Baker, 1985, p. 395).

If we fail to attend to the antagonisms and control issues operating in schools, our efforts to produce changes can only fail. In a 1986 address to the Ethnography in Education conference Susan Florio-Ruane described how a teacher subverted cognitively oriented scaffolding techniques (such as those described by Palincsar, 1986) for the teaching of reading. Techniques designed to improve meaningful comprehension we interpreted and applied so that they produced rote learning.

As we look for strategies to facilitate comprehension and cognition, we must be aware that the meanings assigned to those strategies will be likely to be interpreted through a framework developed in formal schooling. If we are committed to improving learning, we must examine the taken-for-granted structure of schools and how it must be modified. We cannot be content with the status quo, for it interferes with cognitive change.

CONCLUSION

Are these problems with studies of cognition inevitable? Will work on human cognition develop into one more search for angels dancing on pinheads? Not necessarily, but I think we have to examine our practices most carefully. West and Pines mention that the use of qualitative research methods has contributed greatly to the growth of cognitive psychology. We must make sure that we are really using new perspectives and not trying to fit "qualitative" data into former molds. We must practice systematic and communicable ways of doing research that do not mirror the dangers we have seen in thoughtlessly applied quantitative methods.

> Traditional hypothesis-testing methods have a legitimate role, but they should follow rather than precede the thorough description and understanding of the phenomenon <u>in its context</u>.

In order to be more authentically scientific one needs disciplined collection of evidence using a variety of methods, dispassionate and logical interpretation of the evidence, examination of the assumptions underlying both evidence and the methods that generated it, evaluation of the perspectives of individuals who provided the data. (Smith, 1982, p. 637. Italics mine)

We must make our research reports richer and broader. It is not enough to describe differing ways students conceive of a subject. We must attempt to describe the processes and contextual factors that contributed to those understandings and document other ways of

see the feelings that lead students to respond in "safe" ways. We need to examine our own practices to make visible the assumptions we have about teaching/learning that have too much to do with control and too little to do with learning. Until we look at and amend our own practices, we cannot hope to provide the sanctuary within which rational discourse can occur and deeper understandings can develop. We must learn to work with people before we can work with cognition. If we cannot create the emotional climates necessary for communication - thinking and speaking - all our cognitively oriented work will be wasted.

ENGAGEMENT WITH LIVED SITUATIONS: THE CONTEXTS OF LEARNING

In discussing teaching for conceptual change, Strike and Posner

> see learning as a rational enterprise, and we understand rationality as having to do with the conditions under which a person is or should be willing to change his or her mind. (Strike and Posner, 1985, p. 211)

How rationality is developed is an interesting question. MacMillan makes the argument that learning rationality begin with a process more akin to training than to education.

> Rationality in teaching is possible only when there has already been a nonrational impartation or training in the procedures of rationality, as part of the more-or-less primitive language games and world-pictures inherited from the cultural and social context in which the individual has grown up. (MacMillan, 1985, p. 419)

Schools, however, are not always rational places and do not always provide the training in the procedures of rationality. Many writers have looked at the political forces shaping schools, at the "hidden curriculum" and other ways schools server to perpetuate existing social inequities. Britzman (1986) explicates how the compulsory nature of schooling effects profoundly the seemingly autonomous behaviors of teachers. "The influence of the compulsory context on the ways that students are organized accounts for many antagonisms between students and teachers" (Britzman, 1986, p. 444). These antagonisms produce a need for control. Many of the language patterns developed in the school serve a control function, and control language patterns are not those that characterize rational inquiry or discussion. The development of school language patterns begins early. Freebody and Baker (1985) examined the speech patterns presented in basal readers.

> Finally, the representation of an orderly, centrally governed turn-taking system may be seen as a means of presenting the turn-taking system of classroom talk. The idealized versions of child-adult talk shown in the readers approximate the orderliness, formality, and centralized control of

teaching/learning to avoid or ameliorate the problems. We must work to produce the contexts needed to foster the thinking of people as they attempt to live richly. We have to try things out and document our trials, sharing with each other. We must become story tellers, able to produce our stories without bias but with the richness that will allow others to share. We need to create our stories through our work with people struggling with real issues.

Because I think that pedagogy, the art and act of teaching, is the most important human activity there is, if not absolutely so then certainly for those of us who work in education, it is important that efforts to study cognition not travel toward dead ends. The generation of new understandings matters little if we cannot then in turn help others to see and use these new understandings. In introducing the first issue of the new journal Phenomenology + Pedagogy Max van Manen creates a wonderful image to guide our work in cognition:

> A journal of pedagogy then is a particular kind of commons, a space, which draws like-minded men and women to engage in certain kinds of discourse, dialogues, or conversations about the lives they live together with children, adolescents, adults, or with those, young or old, entrusted to their pedagogic care.... [Pedagogy entails] a thoughtfulness about the limits and possibilities of how we speak, of the languages of common sense and science; a thoughtfulness of how we construct and perpetuate the often repressive institutional and ideological environments in which we live and in which we place our children (1983, p. i).

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> Finally, the representation of an orderly, centrally governed turn-taking system may be seen as a means of presenting the turn-taking system of classroom talk. The idealized versions of child-adult talk shown in the readers approximate the orderliness, formality, and centralized control of

> instructional, conversational routines known to characterize "teaching and learning" talk (Edwards, 1980, 1981; McHoul 1978; Mehan, 1979) more than they reflect the complexity, informality, and local management of everyday, conversational, multiparty talk (Freebody and Baker, 1985, p. 395).

If we fail to attend to the antagonisms and control issues operating in schools, our efforts to produce changes can only fail. In a 1986 address to the Ethnography in Education conference Susan Florio-Ruane described how a teacher subverted cognitively oriented scaffolding techniques (such as those described by Palincsar, 1986) for the teaching of reading. Techniques designed to improve meaningful comprehension we interpreted and applied so that they produced rote learning.

As we look for strategies to facilitate comprehension and cognition, we must be aware that the meanings assigned to those strategies will be likely to be interpreted through a framework developed in formal schooling. If we are committed to improving learning, we must examine the taken-for-granted structure of schools and how it must be modified. We cannot be content with the status quo, for it interferes with cognitive change.

CONCLUSION

Are these problems with studies of cognition inevitable? Will work on human cognition develop into one more search for angels dancing on pinheads? Not necessarily, but I think we have to examine our practices most carefully. West and Pines mention that the use of qualitative research methods has contributed greatly to the growth of cognitive psychology. We must make sure that we are really using new perspectives and not trying to fit "qualitative" data into former molds. We must practice systematic and communicable ways of doing research that do not mirror the dangers we have seen in thoughtlessly applied quantitative methods.

> Traditional hypothesis-testing methods have a legitimate role, but they should follow rather than precede the thorough description and understanding of the phenomenon <u>in its context</u>.

In order to be more authentically scientific one needs disciplined collection of evidence using a variety of methods, dispassionate and logical interpretation of the evidence, examination of the assumptions underlying both evidence and the methods that generated it, evaluation of the perspectives of individuals who provided the data. (Smith, 1982, p. 637. Italics mine)

We must make our research reports richer and broader. It is not enough to describe differing ways students conceive of a subject. We must attempt to describe the processes and contextual factors that contributed to those understandings and document other ways of

teaching/learning to avoid or ameliorate the problems. We must work to produce the contexts needed to foster the thinking of people as they attempt to live richly. We have to try things out and document our trials, sharing with each other. We must become story tellers, able to produce our stories without bias but with the richness that will allow others to share. We need to create our stories through our work with people struggling with real issues.

Because I think that pedagogy, the art and act of teaching, is the most important human activity there is, if not absolutely so then certainly for those of us who work in education, it is important that efforts to study cognition not travel toward dead ends. The generation of new understandings matters little if we cannot then in turn help others to see and use these new understandings. In introducing the first issue of the new journal Phenomenology + Pedagogy Max van Manen creates a wonderful image to guide our work in cognition:

> A journal of pedagogy then is a particular kind of commons, a space, which draws like-minded men and women to engage in certain kinds of discourse, dialogues, or conversations about the lives they live together with children, adolescents, adults, or with those, young or old, entrusted to their pedagogic care.... [Pedagogy entails] a thoughtfulness about the limits and possibilities of how we speak, of the languages of common sense and science; a thoughtfulness of how we construct and perpetuate the often repressive institutional and ideological environments in which we live and in which we place our children (1983, p. i).

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